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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/853,001
Filing Date: May 10, 2001
Appellant(s): PUGEL, MICHEL ANTHONY

Reitseng Lin
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 13 November 2006 appealing from the Office action mailed 7 May 2004.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,897,883	HARRINGTON	01-1990
5,227,780	TIGWELL	07-1993
P2001-8279A	EISAKU	01-2001

4,856,081	SMITH	08-1989
6,400,480 B1	THOMAS	06-2002
6,130,910	ANDERSON et al.	10-2000

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 19, 23-28 and 33-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington (U.S. Patent 4,897,883) in view of Tigwell (U.S. Patent 5,227,780), Eisaku (Japan Patent Publication P2001-8278A) and Smith (U.S. Patent 4,856,081).

Regarding claims 19, 33-35 and 37, Harrington discloses a remote control system in FIG. 1. The remote control system comprises a first control device 3 for transmitting a first IR control signal 16, a second control device 4, a third control device 5 and a IR controllable device 1. Harrington shows in FIG. 3 and FIG. 4 the structure for third control device and second control device. The device 5 receives a first control signal from control device 3 and transmits a RF signal to control device 4. Control device 4 receives the RF signal and converts it into an IR control signal for controlling the IR controllable device 1. The difference between Harrington and the claimed invention is that Harrington does not teach the extracting of an IR carrier frequency from the first control signal. Tigwell teaches in col. 2, line 65-col. 3, line 17 that it is not desirable to directly convert the signal from IR to RF and some encoding method is needed to comply with FCC rules. Eisaku teaches in FIG. 9 a message format for transmitting carrier information and remote control code to a remote control device. Finally, Smith teaches in FIG. 5a and FIG. 5b and col. 13, line 44 to col. 14, line 6 a method for determining carrier frequency.

One of ordinary skill in the art would have been motivated to combine the teaching of Tigwell, Eisaku and Smith with the remote control system of Harrington because detecting IR carrier frequency, as taught by Smith, and encoding IR carrier frequency in a short message, as taught by Eisaku, avoid sending RF signal in a bandwidth that violates FCC rules, as taught by Tigwell. Therefore, it is obvious to combine the teachings of Tigwell, Eisaku and Smith with the remote control system of Harrington to include means for extracting command information, including IR carrier frequency, from the first control signal and encode the information for transmitting from the third control device to the second control device where the first IR control signal is reproduced because such approach complies with FCC rules.

Regarding claims 23 and 36, Harrington teaches to use an IR signal as the first control signal.

Regarding claim 24, Smith teaches a method for determining IR carrier frequency.

Regarding claim 25, the transmitting means transmits RF signal with encoded command information and, therefore, no IR carrier.

Regarding claim 26, Tigwell teaches in col. 4, lines 42-44 the use of amplitude modulation.

Regarding claim 27, Eisaku teaches in 12 to include a plurality of control devices with respective controllable devices. It is well known in the art that RF signal can be simultaneously received by the plurality of control devices.

Regarding claim 28, dotted box 14 of FIG. 1 of Harrington suggests to put the first device and the third device in an enclosure.

Regarding claim 38, Harrington teaches in col. 3, line 18 that the IR frequency is in the range of 40,000 Hz. It is well known in the art that more than four bits are needed to encode such a frequency range.

Claims 19-20, 22, 33-35 and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thomas (U.S. Patent 6,400,480 B1) in view of Tigwell (U.S. Patent 5,227,780), Eisaku (Japan Patent Publication P2001-8278A) and Smith (U.S. Patent 4,856,081).

Regarding claims 19, 33-35 and 37, Thomas discloses in FIG. 1 a remote control system with extended range. The remote control system comprises a first control device 1 for transmitting a first IR control signal 3 or a first RF control signal 4, a second control device 6, a third control device 5 and a IR controllable device 2. The device 5 receives a first control signal from control device 1 and transmits a RF signal to control device 6. Control device 6 receives the RF signal and converts it into an IR control signal for controlling the IR controllable device 2. The difference between Thomas and the claimed invention is that Thomas does not teach the extracting of an IR carrier frequency from the first control signal. Tigwell teaches in col. 2, line 65-col. 3, line 17 that it is not desirable to directly convert the signal from IR to RF and some encoding method is needed to comply with FCC rules. Eisaku teaches in FIG. 9 a message format for transmitting carrier information and remote control code to a remote control device. Finally, Smith teaches in FIG. 5a and FIG. 5b and col. 13, line 44 to col. 14, line 6 a method, as an example, for determining carrier frequency. One of ordinary skill in the art would have been motivated to combine the teaching of Tigwell, Eisaku and Smith with the remote control system

of Thomas because detecting and encoding IR carrier frequency avoid sending RF signal in a bandwidth that violates FCC rules. Therefore, it is obvious to combine the teachings of Tigwell, Eisaku and Smith with the remote control system of Thomas to include means for extracting command information, including IR carrier frequency, from the first control signal and encode the information for transmitting from the third control device to the second control device where the first IR control signal is reproduced because such approach complies with FCC rules.

Regarding claim 20, Thomas teaches to transmit both a RF signal 4 and an IR signal 3 as the first control signal. It is obvious to encode the IR carrier frequency in the RF signal because otherwise, FCC rules would be violated as explained above.

Regarding claims 22 and 38, Harrington teaches in col. 3, line 18 that the IR frequency is in the range of 40,000 Hz. It is well known in the art that more than four bits are needed to encode such a frequency range.

Claims 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrington, Tigwell, Eisaku and Smith as applied to claims 19, 23-28 and 33-37 above, and further in view of Anderson et al. (U.S. Patent 6,130,910).

Harrington, Tigwell, Eisaku and Smith have been discussed above in regard to claims 19, 23-28 and 33-37. The difference between Harrington, Tigwell, Eisaku and Smith and the claimed invention is the method of modulating the RF transmitter. Anderson et al. teaches in FIG. 1 an efficient way of modulating the transmitter by modulating the power supply of the power amplifier 260. One of ordinary skill in the art would have been motivated to combine the teaching of Anderson et al. with the modified remote control system of Harrington, Tigwell,

Eisaku and Smith because the method of Anderson et al. is highly efficient and especially suitable for handheld or portable devices. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to modulate the power supply with the control signal, as taught by Anderson et al., in the modified remote control system of Harrington, Tigwell, Eisaku and Smith because the method of Anderson et al. is highly efficient and especially suitable for handheld or portable devices.

Regarding claim 30-32, it is well known in the art that modulation index affects efficiency, distortion etc. and is a design parameter that can be adjusted based on the applications.

Claims 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thomas, Tigwell, Eisaku and Smith as applied to claims 19-22, 33-35 and 37-38 above, and further in view of Anderson et al. (U.S. Patent 6,130,910).

Thomas, Tigwell, Eisaku and Smith have been discussed above in regard to claims 19-22, 33-35 and 37-38. The difference between Thomas, Tigwell, Eisaku and Smith and the claimed invention is the method of modulating the RF transmitter. Anderson et al. teaches in FIG. 1 an efficient way of modulating the transmitter by modulating the power supply of the power amplifier 260. One of ordinary skill in the art would have been motivated to combine the teaching of Anderson et al. with the modified remote control system of Thomas, Tigwell, Eisaku and Smith because the method of Anderson et al. is highly efficient and especially suitable for handheld or portable devices. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to modulate the power supply with the control signal, as

taught by Anderson et al., in the modified remote control system of Thomas, Tigwell, Eisaku and Smith because the method of Anderson et al. is highly efficient and especially suitable for handheld or portable devices.

Regarding claim 30-32, it is well known in the art that modulation index affects efficiency, distortion etc. and is a design parameter that can be adjusted based on the applications.

(10) Response to Argument

The Appellant argues on page 5 of the Brief that there is no motivation to modify the system disclosed in Harrington with the combined teaching of Tigwell, Eisaku, and Smith in the manner suggested by the Examiner and explains the arguments on pages 6-13 of the Brief.

The Appellant argues on page 7 of the Brief that since the system disclosed in Harrington uses FM not AM, the stated problem does not exist and a person skilled in the art would have no motivation to modify the system disclosed in Harrington to use AM and the 7-bit work scheme as taught by Tigwell. The Examiner disagrees. It is true that Tigwell teaches in col. 1, lines 47-55 a system using amplitude modulation (AM) while Harrington teaches a system using frequency modulation (FM). However, a device that modulates radio frequency with IR carrier frequency would violate the FCC rules is not because the device uses amplitude modulation instead of frequency modulation. FCC does not restrict the type of modulation. OET Bulletin No. 63, *Understanding The FCC Regulations for Low-Power, Non-Licensed Transmitters*, October 1993, states on page 7, *Radiated emission limits*, "If a particular transmitter can comply with the general radiated limits, and at the same time avoid operating in one of the restricted bands, then it can use any type of modulation (AM, FM, PCM, etc.) for any purpose." 47 CFR

15.231(c) states, "The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.... Bandwidth is determined at the points 20 dB down from the modulated carrier." That is, FCC restricts the radiation power, which may interference with other channels, instead of the type of modulation. Therefore, the concern of Tigwell is applicable to Harrington.

A brief review of modulation theory and a prior art reference may be helpful for clarifying the issue involved. Chapter 3, *Basic Modulation Techniques*, from Ziemer ("Principles of Communications", Third Edition, by R. E. Ziemer and W. H. Tranter, Houghton Mifflin, 1990, pp. 142-242) provides technical details related to modulation theory. Modulation is a technique for converting a baseband signal to a high frequency signal that is appropriate for being transmitted over a particular medium. For example, in AM radio broadcast, sound (voice or music) signal in the range of 40 Hz-7 KHz is converted to a channel in the frequency range of 530 KHz to 1700 KHz and transmitted using the Earth's atmosphere as medium. In FM radio broadcast, sound signal is converted to a channel in the frequency range of 87.9 MHz to 107.9 MHz. To convert a signal to radio frequency (RF), a carrier of the radio frequency is modulated by the signal, i.e., one or more characteristics of the carrier, such as amplitude, frequency, phase, are modified to represent the signal carried by the carrier. If the amplitude of the carrier is modified according to the signal, it is called amplitude modulation; if the frequency of the carrier is modified, it is called frequency modulation. A result of modulation is the generation of sidebands (see FIG. 3.1 of Ziemer). That is, before the modulation, the unmodulated carrier is of a single frequency and represented as a vertical line segment in the power spectrum plot; after modulation, the modulated carrier includes frequency spectrum above and below the carrier

frequency. The extent or spread of the sideband depends on the spectrum of the baseband signal, the type of modulation and the modulation parameters such as modulation index. Modulation techniques are used to provide multiple channels to share a common medium. For example, there are many AM or FM broadcast stations within a local area, each transmits at a different carrier frequency so that it does not interfere with other stations. This is known as frequency division multiplexing (see p.228, Section 3.5 of Ziemer). However, even if two adjacent stations locate at different carrier frequencies, their sidebands may interfere with the each other if the sidebands occupy too wide a bandwidth (see FIG. 3.65). To ensure that many users can share the same radio medium, FCC regulates the power and bandwidth, i.e., the spectrum of the sidebands, that a transmitter should generate to minimize interferences between the transmitter and the operation of other equipment and other transmitters.

The Appellant states on page 7 of the Brief "the Advisory Action dated August 4, 2004 points out that a RF signal produced by a RF carrier AM modulated by both IR carrier frequency and control information will not violate FCC rules" and makes a conclusion that even if the system in Harrington is modified to use the AM, a person skilled in the art would have no motivation to modify the system disclosed in Harrington to use the 7-bit word scheme as taught by Tigwell because there is no need to do so. First, the Advisory Action dated August 4, 2004 does not make the statement as quoted above. The Advisory Action states "for non-licensed transmitters, FCC does not limit the type of modulation. OET Bulletin No. 63, *Understanding The FCC Regulations for Low-Power, Non-Licensed Transmitters*, October 1993, states on page 7, *Radiated emission limits*, "If a particular transmitter can comply with the general radiated limits, and at the same time avoid operating in one of the restricted bands, then it can use any

type of modulation (AM, FM, PCM, etc.) for any purpose." 47 CFR 15.231(c) states, "The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.... Bandwidth is determined at the points 20 dB down from the modulated carrier." Harrington operates with an IR carrier frequency of 40 KHz while Tigwell operates at an IR frequency of 75 KHz. It is well known in the art that the higher frequency of the modulating signal the higher the bandwidth of the modulated signal. Bandwidth limitation is the reason for Tigwell to avoid modulating RF carrier with IR carrier frequency, as clearly stated in col. 1, line 54.

Second, the Examiner does not suggest to modify Harrington in the way suggested by the Appellant. The Examiner cites Tigwell for teaching that it is undesirable to directly modulate the RF carrier with the IR carrier frequency. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). And the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

The Appellant argues on page 8 of the Brief that after reading Tigwell, a person skilled in the art would be discouraged to modify Harrington to incorporate the teaching of Tigwell because doing so would mean adding microprocessors and associated software/firmware in the repeater unit 5 and the means 4 of the system disclosed in Harrington. The Examiner disagrees.

The fact that a combination would not be made by businessmen for economic reasons does not mean that a person of ordinary skill in the art would not make the combination because of some technological incompatibility. In re Farrenkopf, 713 F.2d 714, 219 USPQ 1 (Fed. Cir. 1983). In fact, the improvement in the system may outweigh the additional cost required for detecting and transmitting IR carrier frequency. Furthermore, Tigwell does not criticize, discredit, or otherwise discourage the solution claimed in the application. Therefore, it does not teach away from the claimed invention. In re Fulton, 73 USPQ2d 1141 (CA FC, 2004).

The Appellant argues on pages 9-10 of the Brief that Eisaku also does not disclose or suggest a remote control device includes "means for extracting an IR carrier frequency from the first control signal and means for transmitting a RF having a second data segment for the control information and the IR carrier frequency" as recited in claim 19. In response to Appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The rejection of claim 19 is based on the combination of Harrington, Tigwell, Eisaku and Smith. Harrington discloses a remote control system in FIG. 1. The remote control system comprises a first control device 3 for transmitting a first IR control signal 16, a second control device 4, a third control device 5 and a IR controllable device 1. Harrington shows in FIG. 3 and FIG. 4 the structure for third control device and second control device. The device 5 receives a first control signal from control device 3 and transmits a RF signal to control device 4. Control device 4 receives the RF signal and converts it into an IR control signal for controlling the IR

controllable device 1. The difference between Harrington and the claimed invention is that Harrington does not teach the extracting of an IR carrier frequency from the first control signal.

Eisaku teaches in FIG. 1 an IR remote control device 4 for controlling a plurality of equipment 3, 3a and 3b. The distance between the remote control device and the equipment to be controlled is extended by transmission line 6, which can be an electrical cable or an optical cable (see paragraphs [0029 to [0030] of Eisaku). Eisaku teaches in paragraphs [0032] and [0033] that the signal 10 conveyed by transmission line 6 comprises IR carrier information and remote control code. That is, Eisaku teaches method and apparatus for transmitting IR carrier information instead of directly modulating the RF carrier with IR carrier frequency. Smith teaches in col. 5, lines 20-43 that there are two types of protocols for remote control transmitters, namely, non-carrier type protocol and carrier-type protocol. (Instant application is related to the carrier-type protocol.) For carrier-type protocol, Smith teaches in FIG. 5a and FIG. 5b procedure for determining the IR carrier frequency.

As discussed above, Tigwell teaches that directly modulating RF carrier with IR carrier frequency would violate FCC regulation and, therefore, it is desirable to convey the IR carrier information using other methods. Smith teaches method for determining IR carrier frequency and Eisaku teaches conveying IR carrier information together with remote control code in a message. Since one of ordinary skill in the art would have been motivated to modify the system of Harrington and such modification is well known in the art and obvious as taught by Eisaku and Smith, the claim invention is not patentable under 35 U.S.C. 103(a).

The Examiner admits that Harrington by itself does not teach all the elements of claim 19. The Examiner also admits that the system Eisaku by itself is not identical as the claimed

invention. However, considered the references as a whole, the combination of Harrington, Tigwell, Eisaku and Smith teaches each and every element of the claimed invention and the claim invention would have been obvious to a person having ordinary skill in the art to which the subject matter pertains.

The Appellant argues on page 10 of the Brief that there is no teaching or suggestion in Eisaku to use the format of the signal 10 in the system disclosed in Harrington because using the format of the signal 10 disclosed in Eisaku would require the system disclosed in Harrington to add a microprocessor at the repeater 5 to determine the carrier frequency of an incoming IR control signal and the control signal carried by the incoming signal, and another microprocessor at the means 4 to retrieve and reproduce the IR carrier and concludes that Smith also can be said to teach away because a person of ordinary skill, upon reading Smith, would be discouraged from following the path set out in Smith. The Examiner disagrees. The fact that a combination would not be made by businessmen for economic reasons does not mean that a person of ordinary skill in the art would not make the combination because of some technological incompatibility. In re Farrenkopf, 713 F.2d 714, 219 USPQ 1 (Fed. Cir. 1983). In fact, the improvement in the system may outweigh the additional cost required for detecting and transmitting IR carrier frequency. Furthermore, Eisaku does not criticize, discredit, or otherwise discourage the solution claimed in the application. Therefore, it does not teach away from the claimed invention. In re Fulton, 73 USPQ2d 1141 (CA FC, 2004).

The Appellant argues on page 11 of the Brief that there is also no motivation to modify the system disclosed in Tigwell to use the format of signal 10 disclosed in Eisaku. The Examiner disagrees. As discussed above, FCC restricts the power spectrum of an RF transmitter and

directly modulating the RF carrier with IR carrier frequency would violate FCC regulation, as taught by Tigwell. Therefore, it is desirable to send control signal with the carrier information between the RF transmitter and RF receiver as taught by Eisaku to avoid violation of FCC regulation.

The Appellant argues on page 11 of the Brief that Smith does not disclose or suggest an IR extender and concludes that there is no motivation to modify the system disclosed in Harrington to determine the IR carrier frequency as taught by Smith. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Harrington and Eisaku teach IR extenders. Tigwell and Eisaku suggest sending IR carrier frequency information instead of directly modulating RF carrier with the IR carrier frequency to avoid violation of FCC regulation. One of ordinary skill in the art would have been motivated to combine the teaching of Tigwell, Eisaku and Smith with the IR extender and sending IR carrier information instead of directly modulating the RF carrier with the IR carrier frequency for avoiding violation of FCC regulation.

The Appellant argues on page 12 of the Brief that a person skilled in the art after reading Smith would be discouraged to modify Harrington to incorporate the teaching of Smith because doing so would mean adding microprocessors and associated software/firmware in the repeater unit 5 and the means 4 of the system disclosed in Harrington. The Examiner disagrees. The fact that a combination would not be made by businessmen for economic reasons does not mean that a person of ordinary skill in the art would not make the combination because of some

technological incompatibility. In re Farrenkopf, 713 F.2d 714, 219 USPQ 1 (Fed. Cir. 1983). In fact, the improvement in the system may outweigh the additional cost required for detecting and transmitting IR carrier frequency. Furthermore, Smith does not criticize, discredit, or otherwise discourage the solution claimed in the application. Therefore, it does not teach away from the claimed invention. In re Fulton, 73 USPQ2d 1141 (CA FC, 2004).

The Appellant argues on page 14 of the Brief that Thomas does not disclose or suggest the feature of extracting an IR carrier frequency from the RF signal 4 and transmitting the RF signal 7 having a data segment for both extracted IR carrier frequency and the control information extracted from the RF signal 4, as recited in claim 19. However, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). For example, Smith teaches how to extract an IR carrier frequency from a signal.

The Appellant argues on page 15 of the Brief that "The Examiner, however, suggests that the RF signal 4 transmitted by the IR controller 1 or the RF signal 7 transmitted by the battery transceiver 5 can use the 7-bit word scheme using AM as taught by Tigwell to comply with the FCC rules. Like Harrington, Thomas uses FM. As such, the stated AM problem does not exist for the system disclosed in Thomas. In fact, Thomas teaches against the use of AM, stating that if modulation is used, it uses FM. See col. 3, lines 26-30." First, the Examiner does not suggest to modify Harrington in the way as stated by the Appellant. The Examiner cites Tigwell for teaching FCC regulation and for sending IR carrier frequency information instead of directly

modulating the RF carrier with the IR carrier frequency for avoiding violation of FCC rules. Second, Thomas never teaches using FM. Col. 3, lines26-30 of Thomas says,

> *The RF signal 7 representative of the IR signal 3 can be of any suitable signal strength and **frequency**, **modulated** or unmodulated, coded or uncoded. For example, the RF signal 7 could be in the UHF range. (Emphasis added.)*

Even though, Thomas mentions the words "frequency" and "modulated", Thomas does not teach frequency modulation (FM). Third, as explained above, FCC regulation does not prohibit the use of AM. FCC restricts the radiation power, which may interference with other channels, instead of the type of modulation. Therefore, the concern of Tigwell is applicable to Thomas.

The Appellant states on page 15 of the Brief "the Advisory Action dated August 4, 2004 points out that a RF signal using AM including both IR carrier frequency and control information will not violate FCC rules" and makes a conclusion that even if the system in Thomas is modified to use the AM, a person skilled in the art would have no motivation to modify the system disclosed in Harrington to use the 7-bit word scheme as taught by Tigwell. First, the Advisory Action dated August 4, 2004 does not make the statement as quoted above. The Advisory Action states "for non-licensed transmitters, FCC does not limit the type of modulation. OET Bulletin No. 63, "Understanding The FCC Regulations for Low-Power, Non-Licensed Transmitters", October 1993, states on page 7, "Radiated emission limits", "If a particular transmitter can comply with the general radiated limits, and at the same time avoid operating in one of the restricted bands, then it can use any type of modulation (AM, FM, PCM, etc.) for any purpose." 47 CFR 15.231(c) states, "The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900

MHz.... Bandwidth is determined at the points 20 dB down from the modulated carrier." Harrington operates with an IR carrier frequency of 40 KHz while Tigwell operates at an IR frequency of 75 KHz. It is well known in the art that the higher frequency of the modulating signal the higher the bandwidth of the modulated signal. Bandwidth limitation is the reason for Tigwell to avoid transmitting RF using IR carrier frequency as clearly stated in col. 1, line 54. Second, the Examiner does not suggest to modify Thomas in the way suggested by the Appellant. The Examiner cites Tigwell for teaching that it is undesirable to directly modulate the RF carrier with the IR carrier frequency. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). And the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

The Appellant argues on page 16 of the Brief that "the battery transceiver 5 in the system disclosed in Thomas, however, receives the RF signal 4, which is not an IR signal. As such, the battery transceiver 5 cannot determine an IR carrier frequency using the method as taught by Smith." First, claim 20 depends on claim 19 and recites the limitation "wherein the IR carrier frequency is included in the first data segment of the first control signal". Therefore, the first control signal can be an RF signal and the IR carrier frequency information can be encoded as data to be included in the RF signal. Eisaku teaches in paragraph [0033] extract IR carrier

frequency information from an RF signal. Since the rejection is based on combinations of Thomas, Tigwell, Eisaku and Smith, one cannot show nonobviousness by attacking unreasonable combination of certain references.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

skl

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